

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
US Department of Commerce
United States Patent and Trademark
Office, PCT
2011 South Clark Place Room
CP2/5C24
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in its capacity as elected Office

Date of mailing (day/month/year) 21 February 2001 (21.02.01)	
International application No. PCT/SE00/01207	Applicant's or agent's file reference 55030-60462
International filing date (day/month/year) 09 June 2000 (09.06.00)	Priority date (day/month/year) 11 June 1999 (11.06.99)
Applicant PERSSON, Charlotte et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
10 January 2001 (10.01.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer F. Baechler Telephone No.: (41-22) 338.83.38
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REC'D 16 JUL 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

14

Applicant's or agent's file reference 55030-60462-JL	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE00/01207	International filing date (day/month/year) 09/06/2000	Priority date (day/month/year) 11/06/1999
International Patent Classification (IPC) or national classification and IPC B65D81/24		
Applicant SCA HYGIENE PRODUCTS AB et al.		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 10/01/2001	Date of completion of this report 12.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Augustin, W Telephone No. +49 89 2399 2629 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SE00/01207

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-15 as originally filed

Claims, No.:

1-8 as received on 14/06/2001 with letter of 14/06/2001

Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/SE00/01207

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 6, 7
	No: Claims 1-5, 8
Inventive step (IS)	Yes: Claims
	No: Claims 6, 7
Industrial applicability (IA)	Yes: Claims 1-8
	No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

R It m V

- 1.) The present application does not satisfy the criterion set forth in Article 33(2) PCT because **the subject-matter of Claims 1-5, 8 is not new** in respect of prior art as defined in the regulations (Rule 64(1)-(3) PCT).

Document US-A-5 833 070 discloses according to the wording of its description (see column 1, lines 41-47) the use of an impervious film material for packaging of a product "with which moisture contact is not desirable". The skilled person knows from this wording that the moisture interacts in with the article. This is only possible if the moisture is in contact with the article and if the article is able to interact with the moisture. Consequently the article absorbent and comprises at least one moisture-sensitive additive.

According to table 1, column 1 the film material has a water vapour transmission rate of 93mg/m²/calender day, i.e. 0,093 g/m²/calender day, measured by the procedure according to column 8, lines 41-57. As the value which is explicitly disclosed in document US-A-5 833 070 is 60 times lower than that of claim 1 it is clear for the skilled person that the water vapour transmission rate of the disclosed film material is lower than 6 g/m²/calender day even if it is measured with a different method, i.e. in accordance with ASTM E 393-83.

According to column 8, lines 41-57 the water vapour transmission rate of the disclosed film material is measured by measuring the penetration of water into the package. This is only possible if the package is fully sealed with impervious joints as otherwise one would measure only the penetration of water through the seam.

Consequently, the subject-matter of claims 1-5, 8 is not new.

- 2.) The dependent claims 7, 8 do not contain any additional features which, in combination with the features of any claim to which they refer, involve an inventive step since they come within the scope of the customary practice followed by persons skilled in the art.

Consequently, **the subject-matter of claims 6, 7 lacks an inventive step (Rule 65(1)(2) PCT).**

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/SE00/01207

Re Item VII

- 1.) The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT.
- 2.) The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

PCT/SE00/01207

14.06.2001

CLAIMS

1. The use of at least one essentially impervious film material that has a highest WVTR (Water Vapour Transmission Rate) of $6 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83 for packaging an absorbent article that comprises one or more moisture-sensitive additives, wherein the package is fully sealed with impervious joins or seams.
2. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $4 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
3. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $2 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
4. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $1 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
5. The use according to any one of the preceding Claims, wherein the packaging material comprises several layers of material, where said various layers comprise one or more than one material.
6. The use according to any one of the preceding Claims, wherein the package comprises a moisture indicator, such as silica gel.
7. The use according to any one of the preceding Claims, wherein the package comprises a moisture absorbent.

8. A pack enclosing an absorbent article for absorption of bodily fluids having at least one moisture-sensitive additive, characterised by that the highest WVTR (Water Vapour Transmission Rate) of the pack is $6 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.

(19) World Intellectual Property Organization
International Bureau



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- (71) Applicant (for all designated States except US): SCA HYGIENE PRODUCTS AB [SE/SE]; S-405 03 Göteborg (SE).
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- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— With international search report.
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES COMPRISING MOISTURE-SENSITIVE ADDITIVES

(57) Abstract: Active additives in absorbent articles, such as sanitary napkins, panty liners, tampons, incontinence protectors and diapers have been found to lose their properties due to taking-up moisture during storage and transportation for instance, when conventional packaging materials are used. The invention relates to the use of a moisture impervious film material for packaging an absorbent article comprising one or more active moisture-sensitive additives. Packaging is effected in film material that has low vapour and gas permeability and in packaging units that have tight joins or seams.



WO 00/76878 A1

THE USE OF MOISTURE IMPERVIOUS PACKAGING UNITS AND PACKAGE FOR ABSORBENT ARTICLES
COMPRISING MOISTURE-SENSITIVE ADDITIVES

5 **FIELD OF INVENTION**

The present invention relates to the use of moisture impervious packaging units for absorbent articles, such as sanitary napkins, panty liners, tampons, incontinence protectors and diapers, that comprise one or more active, moisture-sensitive additives or substances. The packaging unit is comprised of film material that has
10 low vapour and gas permeability and tight joins.

BACKGROUND OF THE INVENTION

15 Absorbent articles, such as sanitary napkins, diapers, incontinence protectors, panty liners and tampons have consistently been packaged in open packages into which air can enter freely. Packaging of this nature has many advantages. Handling with respect to manufacture and also with respect to the individual consumer is facilitated by the fact that the package containing the absorbent article can be
20 compressed (air can leave the package freely), and the package can also be easily opened. It is also difficult from a purely technical aspect to produce tight joins at present day production rates.

However, it is becoming more common to include different active additives in
25 absorbent products for different reasons. Examples in this respect are odour-inhibiting additives or deodorants, such as zeolites and silica for example, as described, *inter alia*, in WO 97/46188, WO 97/46190, WO 97/46192, WO 97/46193, WO 97/46195 and WO 97/46196. These additives are intended to act essentially in the product. Another example is the addition to diapers of softeners,
30 e.g. lotions, which shall be transferred from the product to the wearer's skin. A further example is the addition of lactobacilli with the intention of inhibiting

bacteria in the product, or for transfer to the wearer and thereby enhance defence against undesired bacteria. The addition of lactobacilli and their favourable effects is also mentioned in, *inter alia*, SE 9703669-3, SE 9502588-8, WO 92/13577, SE 9801951-6 and SE 9804390-4.

5

The aforesaid additives often lose some of their properties or effectiveness at high moisture contents. This problem is thus new in the field of absorbent products. The odour-inhibiting capacity of zeolites is reduced when they become saturated with water. This is mentioned, *inter alia*, in WO 98/17239. One problem with lactobacilli
10 in absorbent products resides in their rapid demise when exposed to ambient moisture and temperature above a certain threshold; see Figure 3. Thus, in normal surroundings such as in transportation and during storage, for instance, the absorbent articles will be subjected to such conditions as to render the death of the lactobacilli present unavoidable (see Figure 1) when the articles are packaged in
15 accordance with known technology. Survival of lactobacilli can be achieved by bringing them into a rest state. This state can be achieved either by freezing or drying the lactobacilli, or by a combination of these processes, i.e. so-called freeze-drying. In order to make possible the use of conventional absorbent product distribution and sales channels, drying of the lactobacilli and retention of this
20 dryness is preferred to freezing. When the product, or article, is applied to the body, the moisture and temperature conditions that then prevail will be optimal for re-activation of the lactic acid bacteria.

However, it may be difficult to retain dryness when storing in a humid atmosphere.
25 This applies particularly to absorbent products, as it lies in the nature of the product to absorb moisture from the surrounding atmosphere. It is therefore particularly important to protect absorbent products that contain lactobacilli against high humidities. The packages used at present for packaging absorbent articles cannot be considered to satisfy the need for such protection, partly because the material used
30 is moisture permeable and secondly because the packaging joins or seams are not tight. Single-item packaging units for sanitary napkins and panty liners are often

comprised of polypropylene or polyethylene plastic, which have a relatively high moisture permeability (see table 1, film 8), and the packages are also often provided with an unsealed opening in the centre of the package, so that air is able to pass freely into and out of the package and therewith permit a certain degree of compression. External wrappers or bags are also often perforated to facilitate opening of the package.

US-A-5833070 refers to a stretched film of polychlorotrifluoroethylene, a method for its production, and a product package, in which the film is used. The film must at least partly comprise trifluoroethylene. The film can be used to pack some products in a moisture impermeable way, such as preferably an electro-luminiscent means. Thus, this film is stretched, which leads to it being stiff, fragile and rustle. Accordingly, it is not suitable as a package film for hygiene articles for some reasons. A film for hygiene articles should be silent and smooth to be experienced as discrete by the consumer. A film for hygiene article applications should also be possible to fold, which makes a stiff film unsuitable. Further, the air in the product should be pressed out in the same step as the packaging, which makes a stiff, blister-package like film inadequate.

EP-A1-0773102 refers to a multi-layer laminate and its use. One of the layers must at least partly comprise an ethylene-/cycloolephine-copolymer, and one layer must be a polymer layer. Polyethylene, polypropylene and vinyl are mentioned as possible materials. The thickness of the layers can be 1 μm – 10 mm. This laminate can be used as a moisture protection for drugs and food. The laminate is for instance suitable for use as a PTP (press through pack) or as a blister package. Those types of packages are not suitable for absorbent products, for the reasons discussed above.

Further, EP-A2-0613824 discloses a moisture tissue-containing package, having the object to retain the moisture in a package. The film disclosed here is too thick for use in relation to absorbent articles. US-A-5443161 describes a moisture

impermeable "baby-care"-kit, in which the package consists of a polypropylene layer, having a thickness of 2 mm.

5 In summary, there is thus a need to package absorbent articles that contain moisture-sensitive additives in a manner, which will ensure that these additives will not be harmed or destroyed and which will also ensure that the quality of the product is retained.

10 OBJECT OF THE INVENTION

Accordingly, the object of the present invention is to provide protection against the effect of ambient moisture from the time of packaging an absorbent article to the time when it is used, so as to allow the active additive to retain its properties in the absorbent article during storage and when the absorbent article is used.

15 SUMMARY OF THE INVENTION

20 The invention relates to the use of an essentially tight film material that has a highest WVTR (Water Vapour Transmission Rate) of 6 g/m²/calendar day in accordance with ASTM E 398-83 at 87.8°C (100°F) and 90% relative humidity for packaging an absorbent article that comprise one or more moisture-sensitive additives.

25 DETAILED DESCRIPTION OF THE INVENTION

30 By an "essentially impermeable" film material is meant a material whose impermeability is so high that a package comprised of said material will not allow more moisture to enter than that at which the active moisture-sensitive additive present in the package will essentially retain their properties despite this uptake of moisture. This means that the packaging unit may have a highest WVTR (Water Vapour Transmission Rate) of 6 g/m²/calendar day according to ASTM E 398-83 at

37.8°C (100°F) and 90% relative humidity, preferably at most 4 g/m²/calendar day, and more preferably at most 2 g/m²/calendar day and even more preferably at most 1 g/m²/calendar day. The material used will also preferably protect the moisture-sensitive additives in such a way that said additives will retain their effect for at least 9 months and preferably for 18 months after the packaging date.

By "film material" is meant film that is produced, at least partially, from one or more polymers suitable for use in accordance with the invention, such as PE (polyethylene), PP (polypropylene), PET (polyester), PA (polyamide), PETP, PVA (polyvinyl alcohol), or similar polymers, or aluminium foil, aluminium oxide or silicon oxide or the like, an example of these latter three materials being Techbarrier S, V, H, T, AT, NR, NY (Mitsubishi), Helional WTY (Amcor Flexibles), VA 535670 (metallised PE/PET) (Nordenia), 4364 (Schur-Flexible), Coex HDPE Surlyn (Schur-Flexible), Coex Cheerios (Schur-Flexible).

The data and values mentioned in the foregoing with respect to WVTR (Water Vapour Transmission Rate) correspond to unsaturated values in accordance with the standard ASTM E 398-83, which is generally applied in this field and is known to the person skilled in this art.

By "absorbent article" is meant articles such as sanitary napkins, diapers, tampons, panty liners, incontinence protectors and similar products, that are partially comprised of absorbent material, for instance a cellulose material such as airlaid, LDA, chemical pulp or CTMP.

By "moisture-sensitive additives" is meant additives that are intended to contribute to the effect and function of the product in some way and whose properties may be impaired when they are exposed to moisture, e.g. in storage. Examples of such moisture-sensitive additives are odour-inhibiting additives, such as zeolites and silica, and lactobacilli.

In order to obtain an essentially impermeable packaging unit, the WVTR of the polymeric material used for packaging purposes will be at most $6 \text{ g/m}^2/24 \text{ h}$ measured in accordance with ASTM E 398-83 at 37.8°C (100°F) and 90% relative humidity, preferably at most $4 \text{ g/m}^2/24 \text{ h}$, and more preferably at most $2 \text{ g/m}^2/24 \text{ h}$ and even more preferably at most $1 \text{ g/m}^2/24 \text{ h}$.

Polymeric material suitable for use as packaging unit is, e.g., PE (polyethylene), PP (polypropylene), PET (polyester), PA (polyamide), PETP, PVA (polyvinyl alcohol), or like polymeric material. Aluminium foil, aluminium oxide or silicon oxide, for instance, is used as supplementary sealing material. Examples of such materials are Techbarrier S, V, H, T, AT, NR, NY (Mitsubishi), Helional WTY (Amcor Flexibles), VA 535670 (metallised PE/PET) (Nordenia), 4364 (Schur-Flexible), Coex HDPE Surlyn (Schur-Flexible), Coex Cheerios (Schur-Flexible).

The films used will preferably have a thickness of $10\text{-}200 \text{ }\mu\text{m}$, preferably $20\text{-}100 \text{ }\mu\text{m}$.

The packaging material used is preferably comprised of several layers, where different layers may consist of different materials. The material intended to form a moisture barrier (impervious layer) is often expensive and there is preferably used the thinnest possible film with which the moisture blocking properties will nevertheless still be acceptable. In order to produce packaging material that has good wear strength and can be readily sealed, a less expensive material may be used as outer protective wear layers and/or as inner sealing layers. For instance, the packaging material may include an inner material that enables a good seal to be obtained, e.g. PE, PP, EVA, EEA or wax, an intermediate material that consists of the moisture-protective barrier material, the impervious layer, e.g. aluminium, aluminium oxide, silicon oxide or polyamide (nylon), and a somewhat stronger outer material that functions as barrier material, e.g. PETP, PE or PP. The packaging material may consist of one to ten layers of different materials.

In order to ensure that the packaging unit will prevent the ingress of moisture, it is also important that the package is completely closed with tight joins and seams so that the WVTR of the package will be at most $6 \text{ g/m}^2/24 \text{ h}$ measured in accordance with ASTM E 398-83 at 37.8°C (100°F) and 90% relative humidity, preferably at
5 most $4 \text{ g/m}^2/24 \text{ h}$, and more preferably at most $2 \text{ g/m}^2/24 \text{ h}$ and even more preferably at most $1 \text{ g/m}^2/24 \text{ h}$, even when measured across the joins and seams.

The impermeability of the joins and seams shall at least be equal to the impermeability of the film. Suitable sealing methods are, e.g., heat sealing, heat
10 sealing at low temperatures, or cold sealing. The package may contain one or more articles.

Package sealing methods include heat sealing, heat sealing at low temperatures and cold sealing. In the case of cold sealing and heat sealing at low temperatures, a
15 sealing layer, such as EVA, EEA or wax, is applied to the sealing side of the packaging unit. This sealing layer can be applied over the whole of the surface or solely where sealing shall occur, so-called border coating. In order to facilitate heat sealing, the films used as the impervious packaging layer and welding layer will normally include low density polyethylene (LDPE), optionally co-polymerised with
20 butyl acrylate (EBA) or vinyl acetate (EVA). This enables heat sealing to be effected at high speeds. When packaging an article/articles, it is necessary to press the sealing material together around the product in the case of all sealing methods. This is achieved with the aid of cold, hot or slightly heated wheels or sealing jaws and must be effected at a pressure, and temperature and over a given time period
25 that are appropriate for the material chosen and that will result in the intended joint tightness and joint strength.

The various layers may also be glued together.

The packaging unit shall be given the form of a bag and will preferably be easily opened without requiring the use of a tool to this end, for instance along a tear line. Figure 2 shows alternative designs.

5 The size of the packaging unit will depend on the size of the product and whether the product is three-folded, two-folded or unfolded or folded in some other way when packaged. Folding of the product may be effected in different ways. For instance, a three-folded product may be folded so as to form three parts of identical sizes or so as to form three parts of different sizes. The size of a packaging unit
10 according to the invention will be 77-140 mm (length of the packaging unit across the width of the product) and 75-310 mm (length of the packaging unit in the longitudinal direction of the product) in the case of napkin (including mini-napkin, standard napkin + super and night napkin); 72-95 mm (length of the packaging unit across the width of the product) and 50-170 mm (length of the packaging unit in the
15 longitudinal direction of the product) in the case of a panty liner; and 60-200 mm in width and 60-300 mm in length in the case of an external packaging unit. The packaging units may, of course, be larger for accommodating larger napkins such as incontinence protectors and diapers.

20 According to another aspect of the invention, the packaging unit will include a moisture indicator that shows whether or not the packaging unit has retained its impermeability to moisture. Such a moisture indicator may comprise silica gel, such as silica gel 1-3 mm (manufacturer: Prolab, purchased from KeboLab, Art. No. 27661290), which changes colour when taking up moisture.

25

The packaging unit can be constructed in several ways, for instance by placing two films on one another and sealing the four open sides with respective joins or seams, by joining together a folded film with three joins or seams on the three open sides, by folding a "flow packed" film into two and joining the two open sides together
30 with two joins and a join on the open upper side. A weld join or seam may have a

width of about 20 mm. A few examples of packaging unit constructions will be evident from the following examples.

One aspect of the invention relates to a product packaging process which comprises
5 (1) drying the absorbent article and applying the moisture-sensitive additive to the article either before or after drying said absorbent article, and (2) thereafter sealing the packaging unit containing said absorbent article to which said moisture-sensitive substance has been added.

10 It is important that the packaging unit and its contents are sufficiently dry when actually sealing said unit. This is ensured by drying the absorbent article in manufacture, either before or after applying the active additive.

When the active moisture-sensitive additive is comprised of lactobacilli, the
15 additive can be applied in the form of a freeze-dried powder that contains lactobacilli, or in the form of a lactobacilli suspension. In this case, it is suitable to maintain the lowest possible water content or the highest possible concentration in the suspension in order not to introduce an unnecessary amount of water that must be later dried off. Lactobacilli will preferably be applied in an amount
20 corresponding to 10^4 - 10^{11} , preferably 10^6 - 10^{10} CFU/product (CFU: Colony Forming Unit).

When the moisture-sensitive additive is an odour-inhibitor of the zeolite type, the additive can be applied to the product in powder form. A suitable quantity/product
25 has been found to be 0.5-1.5 g. The zeolite powder may be glued firmly to the absorbent material when said material is a roll material of the kind designated airlaid or LDA. The powder may alternatively be mixed in the cellulose pulp when forming a pulp mat although this is less suitable with respect to zeolites, because of the high moisture content involved in mat forming processes, about 10-12 percent
30 by weight, and because the zeolite will then be able to take up water and thereby impair its odour-absorbing properties, as before mentioned.

It has also been found beneficial to dry the absorbent material in the form of roll material such as LDA or airlaid material, which is known in the manufacture of napkins and panty liners. In this respect, it is suitable to dry the material to a water content below 1-2 percent by weight water. These materials can be dried at, e.g.,
5 105°C over one calendar day.

The atmosphere surrounding the applicator equipment shall be kept as dry as possible, as absorbent material readily absorbs moisture from the surroundings. It
10 has been found suitable for the atmosphere to have a less than 20% humidity. The equipment may also be supplemented with an IR drier (IR oven MA 40, manufacturer: Sartorius, purchased from Tillqvist Analys) mounted on the machine when applying the moisture-sensitive additive.

15 A dry atmosphere can be ensured in the packaging unit, by delivering to said unit a dry gas, e.g. carbon dioxide, that has a highest water content of 5 ppm, prior to sealing the package.

Alternatively, the packaged product can be given a desired degree of dryness by
20 adding a drying substance, a moisture absorbent, such as silica gel or zeolite, for instance.

A Flow Wrapper SP-2 manufactured by Flow Wrapper is an example of packaging machines that can be used to produce a moisture-tight package.

25 When cold sealing, up to about 1500 products/min. can be packaged with known technology.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows temperature and air humidity when transporting sanitary products from Holland to Greece.

Fig. 2 illustrates examples of packaging processes, including joining, seaming and welding configurations (chequered surfaces).

Fig. 3 is a curve illustrating the death of LB at room-humidity 50% at 20°C (schematically) as compared with room humidity of 30% at 20°C applied to a panty liner in an unsealed bag of the mini-grip type.

The following examples are intended merely to describe the invention in further detail and shall not be considered as representing a limitation of the scope of the invention.

Examples

Example 1 - Transport conditions.

This example shows how temperature and air humidity vary in the storage space during transportation of sanitary products (Figure 1) from Holland to Greece. The Figure shows that the relative humidity varies from 27-75% and the temperature varies from 10-50°C.

Example 2 - The affect of moisture on the lifetime of lactobacilli.

Figure 3 illustrates the survival time of lactobacilli that have been applied to a panty liner in a permeable minigrip-type bag in different humidity conditions (30% and 50% respectively). Lactobacilli quickly die in a normal climate (20°C, 50% relative humidity) (Figure 3). These conditions correspond to a water content of an airlaid

article material of about 4 percent by weight. The lactobacilli survive far better at a lower moisture content (20°C, 30 % relative humidity) (Figure 3). The airlaid material has a water content of about 3 percent by weight in this climate.

5 Example 3 - Desiccant.

The following working examples demonstrate the possibility of subsequently drying the material with the aid of a suitable desiccator. Commercially available panty liners retailed under the trademark Libresse were stored in a normal room climate of
10 20°C and 44% humidity. The water content of the products was measured with a hygrometer that included IR elements (IR oven MA 40, manufacturer: Sartorius, purchased from Tillqvist Analys) and found to be 4 percent by weight. The products were then packed singly in impervious aluminium bags together with two different types of desiccant, silica gel, so-called blue gel (silica gel 1-3 mm, Prolab,
15 purchased from KeboLab, Art. No. 27661290) on the one hand and zeolite MOLSIV ADSORBENT type 13X in powder from United Oil Products on the other hand. Different quantities of powder were added, whereafter the samples were stored in a normal room climate (see above) for two calendar days. After two
20 calendar days, the panty liners were taken out of the aluminium packages and the water content determined with the same apparatus as that mentioned above. It was found that the water content of the products had already fallen to about 1.5 percent by weight when adding 1 g powder/package. Higher quantities were not found to significantly lower the water content. The addition of the moisture absorbent powder to the package or to the product is thus an alternative method of achieving
25 the desired dryness in order for the added lactobacilli to survive.

Example 4 - Moisture uptake in odour inhibitors.

The following example is intended to demonstrate the effect of a sealed packaging
30 unit with respect to a deodorising capacity. Panty liners were produced by joining together PE film, airlaid 105 g/m² and NW by means of hotmelt glue. 0.5 g of

ABSCENTS 5000 was added to the product between the plastic backing sheet and the airlaid sheet. Subsequent to manufacture, half of the products were packed in impervious aluminium bags, which were welded together. The other half of the products were packed in conventional one-piece packages, which were open to the atmosphere on one side. The products were then stored in a climate room at a temperature of 20°C and a humidity of 50% for six calendar days. The deodorising or odour-inhibiting capacity was determined after storage in the following way: the products were removed from their respective packages and a 1.5 ml ammonia solution 0.2% was added to the products. The products were then placed in impervious plastic cans. A panel of six persons then carried out a sniff test after two hours. A can that contained a product, which had no zeolite or ammonia, was used as a reference. The cans were marked A=product stored in a conventional bag, B=reference with no ammonia odour, and C=product stored in impervious bags. The panel was asked to compare the samples in pairs and to indicate which sample had the strongest smell. The samples were then ranked from the strongest to the weakest smell. A unanimous verdict of ACB was given.

Example 5 - Material WVTR.

The WVTR of a number of materials was determined in the search for suitable material for use in accordance with the invention. The WVTR of these materials was determined with the aid of an apparatus designated LYSSY L 80-4000. The materials, their thicknesses and measured WVTR are shown in Table 1.

Table 1 - Various materials and their WVTR (Water Vapour Transmission Rate).

	No.	Material	Manufacturer	Thickness	WVTR
				(μm)	($\text{g}/\text{m}^2/\text{cal. Day}$)
5	1	Techbarrier H + PE + PET	Mitsubishi	30	0.3
	2	VA 535670 (metallised PE/PET)	Nordenia	30	0.3
	3	Techbarrier V + PE + PET	Mitsubishi	30	0.7
10	4	4364	Schur-Flexible	85	1.3
	5	Coex HDPE Suriyn	Schur-Flexible	50	1.7
	6	Coex Cheerios	Schur-Flexible	60	2.6
	7	PETP/PE		60	4.9
	8	Libresse SW film	M&W	40	9.7
15	9	Libresse bag (cito)	M&W	40	22

Example 6 - Packaging embodiments.

This example shows three options of constructing packages in accordance with the invention (Figure 2).

CLAIMS

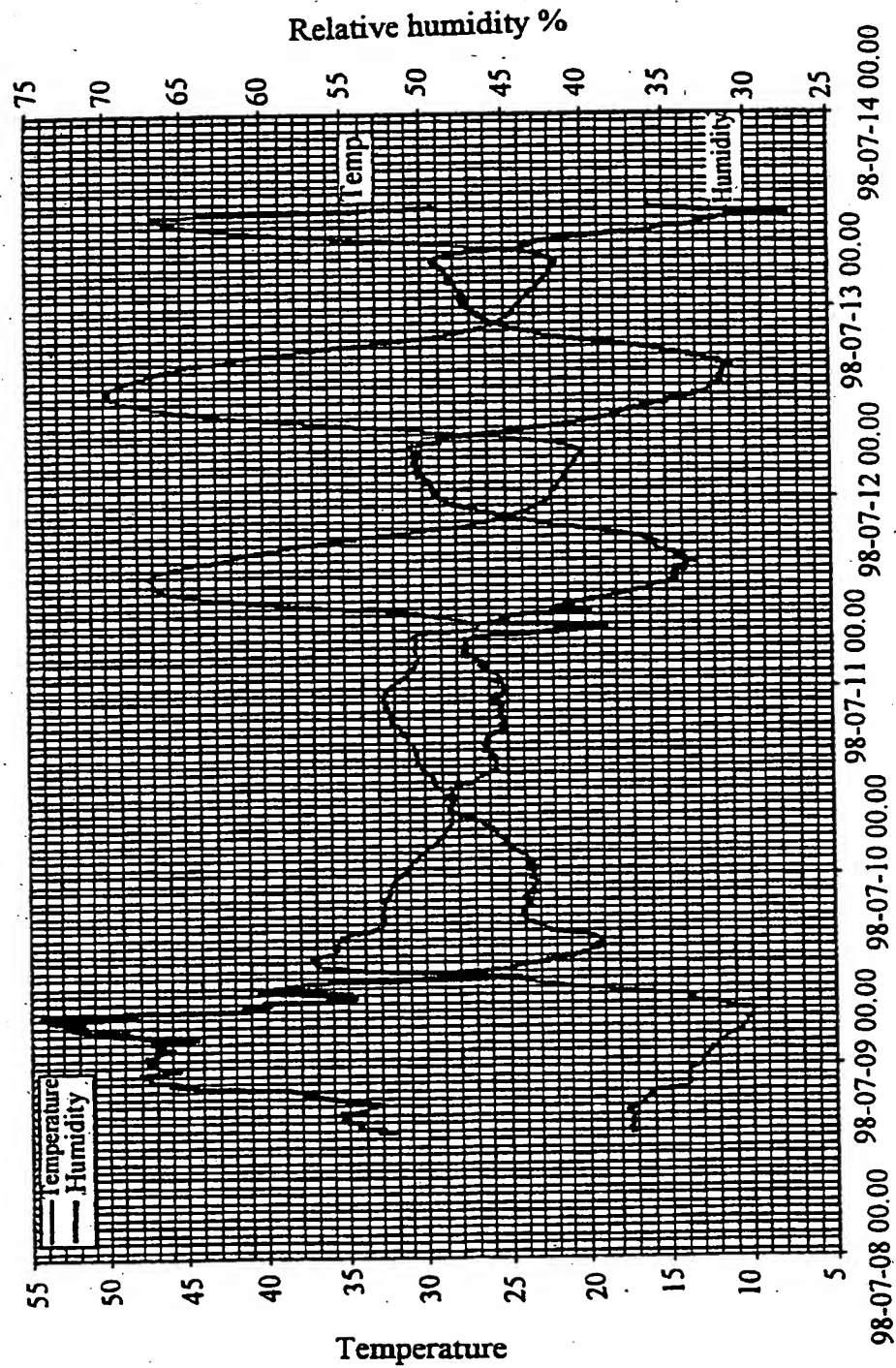
1. The use of at least one essentially impervious film material that has a highest WVTR (Water Vapour Transmission Rate) of $6 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83 for packaging an absorbent article that comprise one or more moisture-sensitive additives.
2. The use according to Claim 1 in which the package is fully sealed with impervious joins or seams, and wherein the highest WVTR of the package is $6 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
3. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $4 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
4. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $2 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
5. The use according to any one of the preceding Claims, wherein the highest WVTR of the package is $1 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.
6. The use according to any one of the preceding Claims, wherein the packaging material comprises several layers of material, where said various layers comprise one or more than one material.
7. The use according to any one of the preceding Claims, wherein the package comprises a moisture indicator, such as silica gel.
8. The use according to any one of the preceding Claims, wherein the package comprises a moisture absorbent.

9. A pack enclosing an absorbent article for absorption of bodily fluids having at least one moisture-sensitive additive, characterised by that the highest WVTR (Water Vapour Transmission Rate) of the pack is $6 \text{ g/m}^2/\text{calendar day}$ in accordance with ASTM E 398-83.

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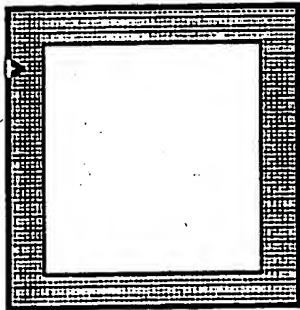
FIG. 1

Transport climate the Netherlands to Greece

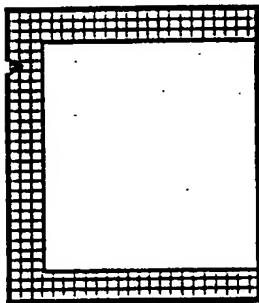
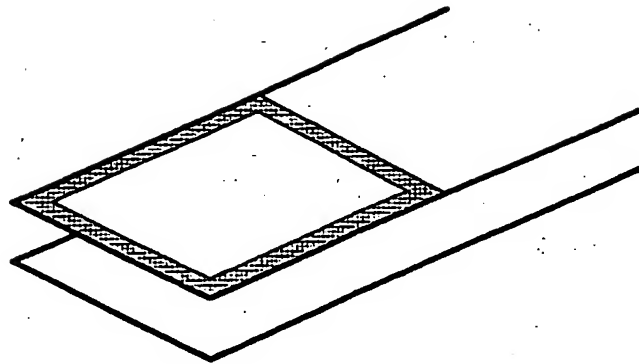


2/3

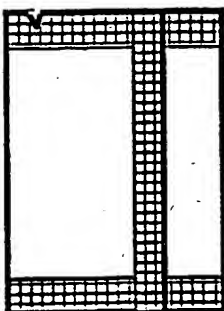
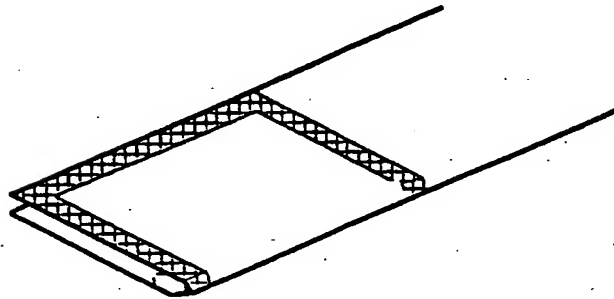
FIG 2



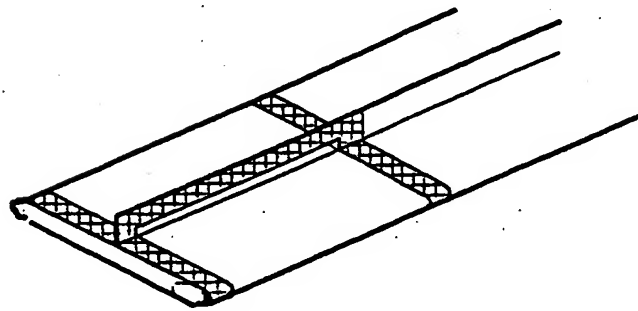
4-side sealing



Folded film with 3-side sealing

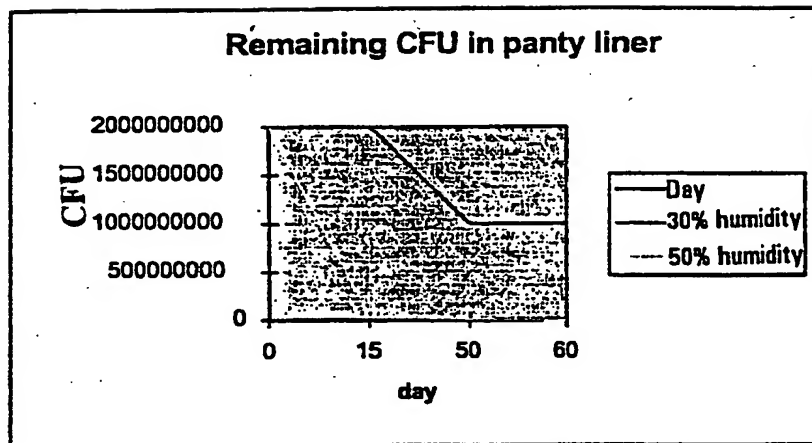


Flow-packed with fin sealing



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FIG. 3



PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 55030-60462	FOR FURTHER ACTION	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/SE 00/01207	International filing date (day/month/year) 9 June 2000	(Earliest) Priority Date (day/month/year) 11 June 1999
Applicant SCA Hygiene Products AB et al		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.
4. With regard to the title,

☐ the text is approved as submitted by the applicant.
☒ the text has been established by this Authority to read as follows:

The use of moisture impervious packaging units and package for absorbent articles comprising moisture-sensitive additives.
5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. The figure of the drawings to be published with the abstract is:
 Figure No.

☐ as suggested by the applicant.
☐ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

☒ None of the figures.

1
INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01207

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65D 81/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61F, B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5833070 A (T. MIZUNO ET AL), 10 November 1998 (10.11.98), column 10, line 16 - line 67, abstract --	1-9
X	EP 0773102 A1 (MITSUI PETROCHEMICAL INDUSTRIES, LTD.), 14 May 1997 (14.05.97), page 33, line 1 - line 34, abstract --	1-9
A	EP 0613824 A2 (L.A. CINZIA), 7 Sept 1994 (07.09.94), abstract --	1-9

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

14 Sept 2000

Date of mailing of the international search report

21 -09- 2000

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01207

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9917813 A1 (SCA HYGIENE PRODUCTS AB), 15 April 1999 (15.04.99), page 17, line 1 - line 30 --	1-9
A	US 5443161 A (D.R. JONESE), 22 August 1995 (22.08.95), column 3, line 52 - column 4, line 9 -- -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/06/00

International application No.

PCT/SE 00/01207

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				JP	8039664 A	13/02/96

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				CN	1151715 A	11/06/97
				WO	9601184 A	18/01/96

EP	0613824	A2	07/09/94	DE	4306760 A	08/09/94

WO	9917813	A1	15/04/99	AU	9470798 A	27/04/99
				SE	9703669 D	00/00/00
				ZA	9809211 A	22/04/99

US	5443161	A	22/08/95	NONE		
